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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/811,899	03/30/2004	Shinichi Takahashi	50943-025	1321

7590 01/24/2007

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EXAMINER	
THOMPSON, MELISSA	
ART UNIT	PAPER NUMBER
1745	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/24/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/811,899	TAKAHASHI, SHINICHI	
	Examiner	Art Unit	
	Melissa B. Thompson	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *3/30/2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: Page 4, paragraph 19 the water channel is labeled as being number 10 in Figure 1. However, there is no number 10 in Figure1, and therefore the number "10" should be number "11" in the specification. Page 5, paragraph 20 the word "be" should be removed from the sentence beginning with "For instance".

Appropriate correction is required.

Claim Objections

2. Claim 2 is objected to because of the following informalities: There is no period at the end of claim 2.

Appropriate correction is required.

3. Claim 5 is objected to because of the following informalities: There is an added letter in the claim. The letter "a" after the word "are" should be removed from the claim.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States

only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-7 and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Kindler et al. (U.S. Patent Number 6,440,594 B1).

The water channel recited in claims is interpreted as being the reactant flow channel in the separator of the fuel cell, where the product water or water in the reactant gas flows out the reactant flow channel of the separator plate.

Kindler et al. disclose a fuel cell where each membrane electrode assembly is sandwiched between a pair of flow-modifying plates which comprise biplates and endplates respectively (column 14, lines 59-61). Kindler et al. disclose that each biplate is a two-sided separator that prevents contact between the anode and the cathode of the fuel cell. The biplate includes provisions for fluid flow at both of its oppositely facing surfaces. These comprise a series of intersecting flow channels (column 15, lines 19-26). Kindler et al. disclose that a preferred biplate assembly includes an air entrance port located at one edge of the biplate, to allow air to enter and remove water, which accumulates during operation (column 15, lines 51-52), in the flow channels of the biplate. Since accumulated water flows through the flow channels, the flow channels are also considered water channels. Kindler et al. disclose that the biplates of the liquid feed fuel cells are provided with a hydrophilic surface (column 16, lines 35-37); an example of a hydrophilic material that can be applied to the surface of the biplate is N-isopropyl acrylamide (column 16, lines 43-53). By attaching a polymer as the hydrophilic material to the surface of the water channels on the

biplates, the fuel cell inherently has a structure (the biplate) wherein polymer chains that form an entanglement among themselves since N-isopropyl acrylamide is the same hydrophobic polymer used by the applicant in the instant invention. Because the polymer used is N-isopropyl acrylamide, it inherently is a thermo-responsive polymer that undergoes volume phase transition in accordance with the temperature of water and that the polymer contracts at temperatures of 40°C or higher and expands at temperature of 20°C or lower. With regards to claims 2 and 10, it is inherent that when the fuel cell is operating, water will flow through the water channels (reactant flow channels) which would break up the polymer entanglement coated therein and that when the fuel cell is not operating, some water will remain in the water channels and the water will be held in the N-isopropyl acrylamide in the biplate. When the fuel cell operation is stopped, the reactant gas flow in the flow channels, is also stopped such that the water flowing through the reactant flow channel would also stop. Alternatively, with respect to claim 2, the method of operating the apparatus is not given patentable weight in an apparatus claim; the manner of operating the device does not differentiate apparatus claim from the prior art (see MPEP 2114).

6. Claims 8 and 9 are rejected under 35 U.S.C. 102(e) as being anticipated by Kanno (U.S. Publication Number 2003/0017375 A1).

Kanno discloses a fuel cell system that prevents water from freezing in a fuel cell when the fuel cell is activated in cold climates (paragraph 8). The fuel cell includes a pump for adjusting the flow rate of the cooling medium in the

cooling medium channel (paragraph 10). Kanno discloses that the cooling water pump is a device for generating the moving force for circulating the cooling water in the cooling water channel and a driving amount can be adjusted according to a drive voltage (paragraph 37). Kanno discloses that the fuel cell system may have a configuration in which a valve for discharging water is provided at either the inlet or the outlet of the fuel cell on the cooling water channel. And a portion of the cooling water is discharged to the outside of the fuel to reduce the amount of the cooling water accumulating in the fuel cell when the cooling water pump is at rest (paragraph 79).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melissa B. Thompson whose telephone number is (571) 272-2758. The examiner can normally be reached on Monday through Friday from 8am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's Trainer, Susy Tsang-Foster can be reached on (571) 272-1293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MBT

SUSY TSANG-FOSTER
PRIMARY EXAMINER